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PROJECT 2 ABSTRACT
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Recurrent selection is a breeding procedure with the objective of increasing the frequency of desirable alleles for one or more traits while maintaining a high level of variability in the population. Intermating among the selected parents each generation allows recombination to occur thus combining genes from different sources.

The objective of this project is to advance male-sterile facilitated recurrent selection populations to combine genes for FHB resistance from multiple sources in soft winter wheat backgrounds adapted to the eastern U.S. The goal for this project is to develop several adapted breeding populations with genes for FHB resistance derived from multiples sources.

This project is a continuation of the project begun in 2009 to generate FHB male-sterile facilitated recurrent selection populations with FHB resistance in the eastern soft wheat region. The populations use a dominant male-sterile gene. Preliminary work on development of male-sterile populations was conducted at Wooster, Ohio by Ed Souza, Mary Guttieri and Clay Sneller. They grew these populations each year from 2006 - 2010 using various soft red and soft white winter wheat breeding lines, germplasm and varieties as pollinators. Some of these lines and varieties were included as sources of FHB resistance and others were included as sources of adaptation and high yield potential.

In the 2012-2013 season and subsequent years the male-sterile facilitated recurrent selection (MSFRS) populations were space-planted at six locations (one location was grown in Illinois, Indiana, Kentucky, Missouri, New York and Ohio, Michigan was added later and Ohio discontinued) usually in an inoculated, and mist-irrigated FHB field evaluation nursery. Locally selected lines with FHB resistance are planted adjacent to the MSFRS population to serve as pollinators. Each year sterile heads are identified at each location. Sterile heads that are very susceptible to *Fusarium graminearum* are removed. Sterile heads remaining are harvested and threshed, and Fusarium damaged kernels are removed by aspiration. Each breeding program will plant the MSFRS population again the fall of 2017 to initiate the next cycle of selection and crossing. As a result of this project breeding programs in the eastern U.S. have several pools of germplasm from which to extract breeding lines. The breeding lines extracted from these populations potentially have unique combinations of FHB resistance genes. Because of the male-sterility in these populations individual breeders should be able to use these populations to develop new combinations of FHB resistance genes and select lines from these populations. Several breeding programs are now extracting fertile lines from the local populations. Intermating with adapted FHB resistant male parents will be continued.